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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,816	03/29/2004	Robert M. Hilton	MTB001US1D	5029
27906	7590	09/22/2004	EXAMINER	
PATENT LAW OFFICES OF DAVID MILLERS 6560 ASHFIELD COURT SAN JOSE, CA 95120			HARRISON, MONICA D	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/812,816

Applicant(s)

HILTON ET AL.

Examiner

Monica D. Harrison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-17 is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 8-12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Gillette et al (5,831,832).

1. Regarding claim 1, Gillette et al discloses a packaged device comprising: a substrate (Figure 2, reference 30) having conductive traces (Figure 2, references 44, 50, and 54) on a first face (Figure 2, reference 32) and a ball grid array (Figure 2, reference 52) on a second face (Figure 2, reference 34) that is opposite the first face; a die (Figure 3, reference 38) having metal bumps formed on a major surface of the die (Figure 3, reference 52), the die being placed so that the metal bumps contact the conductive traces on the first face of the substrate (Figure 2, reference 44, 50, and 54), wherein an edge of the die overlies a portion of the ball grid array (Figure 2, reference 52); a dam surrounding the die on the first face of the substrate (Figure 2, reference 40); and a fill material (Figure 2, reference 42) filling of a gap between the die and the substrate and extending from under the die onto the first face of the substrate, wherein the dam confines and shapes an edge of the fill material that overlies a portion of the ball grid array.

2. Regarding claim 4, Gillette et al discloses further comprising a ball grid array on a side of the substrate opposite to the die, the ball grid array having a pitch that is less than or

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about equal to one half a separation between the dam and an edge of the die (column 1, lines 23-28; Figure 2, reference 52).

3. Regarding claim 5, Gillette et al discloses wherein the dam has a width that is between one and two times the pitch of the ball grid array (Figure 2, reference 40).

4. Regarding claim 6, Gillette et al discloses wherein the dam comprises a structure attached to the substrate (column 3, lines 55-67).

5. Regarding claim 7, Gillette et al discloses wherein the die resides inside a depression in the substrate (Figure 2, reference 38), and the dam (Figure 2, reference 40) comprises a portion of the substrate surrounding the depression (Figure 2, reference 36).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillette et al (5,831,832) in view of Wensel (5,936,310).

6. Gillette et al discloses all above claimed subject matter except wherein the fill material when liquid has a wetting angle at the die that is less than 45 degrees down from a top surface of the dam (claim 2) and wherein the fill material when liquid has a wetting angle at the dam that is less than 45 degrees down from a top surface of the dam (claim 3).

Wensel discloses except wherein the fill material when liquid has a wetting angle at the die that is less than 45 degrees down from a top surface of the dam (column 5, lines 15-30) and

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wherein the fill material when liquid has a wetting angle at the dam that is less than 45 degrees down from a top surface of the dam (column 5, lines 15-30).

Since Gillette et al and Wensel are both from the same field of endeavor, the purpose disclosed by Wensel would have been recognized in the pertinent art of Gillette et al.

It is obvious, at the time the invention was made, to one with ordinary skill in the art, to modify Gillette et al with the teachings of Wensel for the purpose of using a damming technique in order to cope with encapsulant flow problems.

***Allowable Subject Matter***

7. Claims 8-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 13-17 are allowed over the prior art of record.

***Reasons for Allowance***

9. The following is an examiner's statement of reasons for allowance: The primary reason for allowance of the claims is that the prior art neither teaches nor fairly suggest the packaged device as presented in the independent claim 13. Major emphasis is being placed upon the provision of "*a fill material filling of a gap between the die and the substrate and forming a bead on the treated regions, wherein the treated region is such that the fill material when liquid has a higher affinity for the treated region than for an adjacent region of the substrate so that the treated region confines the fill material when liquid and shapes the bead*", in combination with other limitations of the said claim and its dependent ones.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on 571-272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Monica D. Harrison  
AU 2829

mdh  
September 8, 2004

  
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